

WHAT IS CLAIMED IS:

1. A method of forming a textured metal structure comprising the steps of:
forming a textured structure comprised of substantially silicon atoms;
and

5 replacing silicon atoms in the textured structure with metal atoms.

2. The method of Claim 1, wherein the step of forming a textured structure
comprises:

depositing an amorphous or polycrystalline silicon structure by chemical
vapor deposition; and

10 annealing the silicon structure to form a silicon surface having a
textured surface morphology.

3. The method of Claim 1, wherein the step of replacing silicon atoms with
metal atoms comprises exposing the textured structure to a refractory metal-halide
complex.

15 4. The method of Claim 3, wherein the refractor metal-halide complex
comprises WF_6 .

5. The method of Claim 4, further comprising the step of chemically
oxidizing the textured structure prior to exposing the textured structure to the
refractory metal-halide complex.

20 6. A process for fabricating a metal-insulator-metal capacitor on a
semiconductor wafer comprising the steps of:

forming a silicon electrode structure on the semiconductor wafer;

texturizing the silicon electrode structure; and

25 replacing the silicon in the silicon electrode structure with a metal,
thereby forming a textured metal electrode.

7. The process of Claim 6, further comprising covering the textured metal
electrode with a dielectric layer having a high dielectric constant.

8. The process of Claim 7, further comprising covering the dielectric layer
with a metal layer.

30 9. The process of Claim 6, wherein the step of replacing the silicon in the
silicon electrode structure comprises exposing the silicon electrode structure to a

refractory metal-halide complex.

10. The process of Claim 9, wherein the refractory metal-halide complex comprises WF_6 .

5 11. The process of Claim 7, wherein the dielectric layer comprises a material selected from the group consisting of Ta_2O_5 , BaTiO_3 , SrTiO_3 , $\text{Ba}_x\text{Sr}_{1-x}\text{TiO}_3$, and $\text{PbZr}_x\text{Ti}_{1-x}\text{O}_3$.

12. The process of Claim 8, wherein the metal layer comprises titanium.

10 13. A DRAM capacitor comprising:
a metal electrode having a textured surface morphology;
a dielectric layer superjacent to the metal electrode; and
a conductive layer superjacent to the dielectric layer.

14. The DRAM capacitor of Claim 13, wherein the metal electrode is comprised of substantially a refractory metal.

15 15. The DRAM capacitor of Claim 14, wherein the refractory metal is tungsten.

16. The DRAM capacitor of Claim 13, wherein the dielectric layer is comprised of a material selected from the group consisting of Ta_2O_5 , BaTiO_3 , SrTiO_3 , $\text{Ba}_x\text{Sr}_{1-x}\text{TiO}_3$, and $\text{PbZr}_x\text{Ti}_{1-x}\text{O}_3$.

20 17. The DRAM capacitor of Claim 13, wherein the conductive layer comprises a refractory metal.

18. The DRAM capacitor of Claim 17, wherein the refractory metal is titanium.

25 19. A capacitor within an integrated circuit comprising:
a metal electrode having a textured surface;
a dielectric layer covering said textured surface; and
a second electrode covering said dielectric layer.

30 20. A method of forming an integrated circuit capacitor comprising:
forming a metal electrode having a textured surface;
covering said textured surface with a dielectric; and
covering said dielectric with a second electrode.